Curbside Consult

Should patients on insulin inform the vehicle licensing authorities?

Greg Nelson/AP

This man experienced insulin-induced hypoglycemia while driving. The police thought he was a drunken driver, and used dogs and physical force to subdue him.

Underlying this question of whether to inform licensing authorities is the deep unrest felt by physicians, patients who have experienced hypoglycemia, and if they have given it some thought, society in general regarding the true safety of the driver taking hypoglycemic agents.

An American Diabetes Association position statement includes "employment/licensure" in its title but does not mention licensure in its text.[1]

What is known about this topic? Cox and colleagues studied 37 type 1 diabetic subjects with a history of severe hypoglycemia by using a sophisticated driving simulator during the gradual induction of hypoglycemia.[2] The subjects were instructed to treat their low blood glucose levels (<72 mg/dL or 4 mmol/L), and to take corrective action if they felt that their driving was impaired. In this study, even mild hypoglycemia led to impaired driving. But only 30% of subjects took corrective action, such as pulling off the road or eating a high carbohydrate snack. The authors concluded that there appears to be no connection between awareness of driving impairment and corrective action.

The Diabetes Control and Complications Trial (DCCT), which showed a 50% to 75% reduction in microvascular end points (eg, diabetic retinopathy) in the intensive treatment arm, also highlighted the risks and limitations of current therapy, namely hypoglycemia.[3,4] Hypoglycemia is the limiting factor in the pharmacologic treatment of diabetes mellitus.[5]

DCCT patients receiving intensive therapy were over 3 times more likely to develop severe hypoglycemia.[4] This translates into episodes requiring assistance from others in 25% of intensively treated patients per year compared to 10% on conventional therapy. Furthermore, those on intensive treatment averaged 2 mild, self-treated hypoglycemia episodes per week compared to 1 per week on conventional treatment. Many type 1 diabetics who have the disease for up to 10 to 15 years develop hypoglycemia unawareness—that is, they may lapse into coma or have a seizure with no premonitory symptoms. Hypoglycemia awareness is related to loss of counter-regulation by glucagon and epinephrine. In patients without autonomic neuropathy, repeated hypoglycemia during attempts to achieve normoglycemia may be the most common cause of such unawareness. As Cryer has noted, this may be reversed by as little as 2 to 3 weeks of meticulous blood glucose control with scrupulous avoidance of hypoglycemia.[5]

All of the sulfonylureas and repaglinide can cause hypoglycemia. Fortunately, thiazolidinediones, metformin, α glucosidase inhibitors, and diet alone do not.

What can be done? Cox and colleagues note that blood glucose awareness training increases awareness of blood glucose fluctuations, results in fewer and less extreme hypoglycemic events, and leads to fewer vehicular crashes when compared to subjects in control groups without such training.[2] Diabetic patients who drive should be encouraged to treat themselves immediately whenever they think that their blood glucose is low or their driving is impaired. We should remember, however, that 45% of subjects in Cox and colleagues' study were willing to drive when their blood glucose was <50 mg/dL (2.8 mmol/L), while 43% of significantly impaired drivers never took corrective action. Loss of judgment may be a cardinal sign of hypoglycemia.

It is prudent for a person with diabetes taking insulin, sulfonylureas, or repaglinide to check their blood sugar level before driving and if it is in or below the 72-90 mg/dL (4-5 mmol/l) range, not to start driving until they have normalized their blood sugar level. All diabetic drivers taking these agents should have a readily absorbable source of sugar available—but those also using an α glucosidase inhibitor may have slower absorption of sucrose (table sugar) and should use pure glucose tablets. It also makes sense to periodically test blood glucose levels on long drives. If available, blood glucose awareness training may reduce the risk of hypoglycemia as a cause of accidents and "near misses." Education of family and friends regarding recognition of hypoglycemia and its treatment is useful. To paraphrase a well-known advertisement, "Friends don't let friends drive hypoglycemic."

If only insulin use was reportable to licensing authorities, there would be enormous resistance and reluctance on the part of diabetic drivers to take insulin, even when needed, and on the part of physicians to prescribe this hypoglycemic agent. Therefore, since it is unclear what licensing agencies would or could do with the information, there appears to be nothing to gain and much to lose with mandatory notification. It would be better to disseminate the guiding principles alluded to in this commentary.

References

1 American Diabetes Association. Position statement: Hypoglycemia and employment/licensure. *Diabetes Care* 2000;23 (Suppl.1; January): S109.

2 Cox DJ, Gonder-Frederick LA, Kovatchev BP, Julian DM, Clarke WI. Progressive hypoglycemia's impact on driving simulation performance. Occurrence, awareness and correction. *Diabetes Care* 2000;23:163-170.

3 The Diabetes Control and Complications Trial Research Group: the effect of intensive treatment of diabetes on the development and progression long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993;329:977-986.

4 The Diabetes Control and Complications Trial. Research Group: hypoglycemia in the Diabetes Control and Complications Trial *Diabetes* 1997;46: 271-286.

5 Cryer PE. Hypoglycemia-induced autonomic failure in insulin dependent diabetes mellitus. *Proc Assoc Am Physicians* 1995;107:67-70.

Robert Matz

Professor of Medicine, Mt. Sinai School of Medicine, New York, NY

Correspondence to:

Dr Matz

robert.matz@mountsinai.org

Competing interests: None declared

West J Med 2000;173:346-347